# MATH2907

## Discrete Mathematics II

Session 1, In person-scheduled-weekday, North Ryde 2024

*School of Mathematical and Physical Sciences*

# Contents

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# General Information

Unit convenor and teaching staff
Unit Convenor
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12 WW 618
See iLearn

Lecturer
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Credit points
10

Prerequisites
MATH1007 or MATH1020 or MATH1025 or DMTH137 or MATH133 or MATH136

Corequisites

Co-badged status

Unit description
The purpose of this unit is to give a grounding in discrete mathematics. It is important
preparation for theoretical computing, software engineering and abstract algebra. The unit
explores topics in areas such as computability and computational complexity; formal
languages and finite state machines; recurrence relations and generating functions;
computational applications of graphs, trees and matrices; and formal methods in
programming.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are
available at https://www.mq.edu.au/study/calendar-of-dates

# Learning Outcomes

On successful completion of this unit, you will be able to:

> **ULO1:** Apply a broad range of standard mathematical techniques used in computer
> science.

> **ULO2:** Use formal mathematical methods to design, model and validate solutions to

computational problems.

**ULO3:** Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.

**ULO4:** Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

# General Assessment Information

**Requirements to Pass this Unit**

To pass this unit you must:

• Achieve a total mark equal to or greater than 50%, and

• Participate in, and undertake all the Practice-based activities for a minimum of 10 of the 12 weekly SGTAs.

**Assessment 1: Practice-based skills for SGTA classes (0%)**

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of statistical techniques. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in 10 out of 12 SGTAs. This is a hurdle assessment meaning that failure to meet this requirement may result in a fail grade for the unit. Students are permitted up to two absences: additional absences will require a Special Consideration to be applied for (see below).

**Late Assessment Submission Penalty**

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of 0 will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance as- sessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

• Assignment 1 – YES, Standard Late Penalty applies

• Assignment 2 – YES, Standard Late Penalty applies

• Module Test 1 - NO, unless Special Consideration is granted

• Module Test 2 - NO, unless Special Consideration is granted

• Module Test 3 - NO, unless Special Consideration is granted

**Special Consideration**

The Special Consideration Policy aims to support students who have been impacted by short term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the con- venor and submit a Special Consideration request through ask.mq.edu.au.

**Weekly practice-based tasks for SGTA classes**: To pass the unit you need to demonstrate ongoing development of skills and application of knowledge in 10 out of 12 of the weekly SGTA classes. If you miss a weekly SGTA class due to a serious, unavoidable and significant disruption, contact your convenor ASAP as you may be able to attend another class that week.

If it is not possible to attend another class, you should still contact your convenor for access to class material to review in your own time.

Note that a Special Consideration should **only be applied** for if you miss more than two of the weekly SGTA classes.

# Assessment Tasks

| Name | Weighting | Hurdle | Due |
|---|---|---|---|
| Participation in SGTA classes | 0% | Yes | Weekly |
| Online quizzes | 10% | No | Weekly |
| Assignment 1 | 18% | No | Week 5 |
| Assignment 2 | 24% | No | Week 12 |
| Module Examinations | 48% | No | Weeks 6, 10, 13 and Final Exam period |

## Participation in SGTA classes

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 0 hours
Due: **Weekly**
Weighting: **0%**
**This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)**

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of mathematical techniques. To pass this hurdle assessment, you must be able ability to engage with the unit by actively participating progress in SGTA classes developing and

communicating knowledge and skills in 10 out of 12 SGTAs.

On successful completion you will be able to:

- Apply a broad range of standard mathematical techniques used in computer science.
- Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

# Online quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **Weekly**
Weighting: **10%**

The quizzes are competency tests to ensure that all students who pass this unit possess certain basic skills.

On successful completion you will be able to:

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# Assignment 1

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 10 hours
Due: **Week 5**
Weighting: **18%**

Solve a given set of questions and communicate your results in a clear and logical way in writing.

On successful completion you will be able to:

• Apply a broad range of standard mathematical techniques used in computer science.

• Use formal mathematical methods to design, model and validate solutions to computational problems.

• Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.

• Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

# Assignment 2

Assessment Type [1]: Project
Indicative Time on Task [2]: 15 hours
Due: **Week 12**
Weighting: **24%**

Solve a more involved project based problem, explain your solution and communicate your results in a clear and logical manner.

On successful completion you will be able to:

• Apply a broad range of standard mathematical techniques used in computer science.

• Use formal mathematical methods to design, model and validate solutions to computational problems.

• Understand the theoretical limitations of computing devices and the problems that can be solved by a computer.

• Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

# Module Examinations

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **Weeks 6, 10, 13 and Final Exam period**
Weighting: **48%**

The unit is structured as three modules. At the end of each module students complete a module exam which is offered during their SGTA class. They are offered a second opportunity to complete a different version of each module exam during the final exam period. If a student makes two attempts at an exam for a module, the final mark awarded is the maximum of the

marks attained in each attempt.

On successful completion you will be able to:

- Apply a broad range of standard mathematical techniques used in computer science.
- Use formal mathematical methods to design, model and validate solutions to computational problems.
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- Communicate mathematical arguments incorporating deductive reasoning, particularly in areas concerning how computer programs work.

[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

# Delivery and Resources

**Classes**

Lectures (beginning in Week 1): There are two one-hour lectures each week.

SGTA classes (from week 2 to 13): Students must register in and attend one two-hour class per week. This is a hurdle requirement. Missing more than two SGTA classes will result in failure of the unit.

**Suggested textbooks** The following textbooks are useful as supplementary resources, for additional questions and explanations. They are available from the Macquarie University library:

- Kenneth H Rosen, Discrete Mathematics and Its Applications, McGraw-Hill, any edition.

Other useful resources and materials will be made available via the MATH2907 iLearn site.

# Technology Used and Required

Students are expected to have access to an internet-enabled computer with a web browser and Adobe Reader software. Most areas of the university provide wireless access for portable devices. There are computers for student use in the Library.

Furthermore, some assessments may require you to write solutions to problems in handwritten form and to scan them in for online upload. So you should have access to a device, such as a

flatbed scanner or mobile phone, that will allow you to make electronic images of your work.

Difficulties with your home computer or internet connection do not constitute a reasonable excuse for lateness of, or failure to submit, assessment tasks.

### Communication

We will communicate with you via your university email or through announcements on iLearn.

Queries to convenors can either be placed on the iLearn discussion board or sent to your lecturers from your university email address.

### COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs.

Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

# Unit Schedule

| Week | Module | Topic | Assessment due |
|------|--------|-------|----------------|
| 1 (19 Feb) | 1 | Graph algorithms | |
| 2 (26 Feb) | | Graph algorithms | Quiz |
| 3 (4 Mar) | | Linear algebra | Quiz |
| 4 (11 Mar) | | Linear algebra | Quiz |
| 5 (18 Mar) | 2 | Languages and grammar | Assignment 1, Quiz |
| 6 (25 Mar) | | Languages and grammar | Module Exam 1, Quiz |
| 7 (1 Apr) | | Finite state machines | Quiz |
| 8 (8 Apr) | | Finite state machines | Quiz |
| | | Mid term break | |
| 9 (29 April) | 3 | Finite state machines and Turing Machines | Quiz |
| 10 (6 May) | | Counting | Module Exam 2, Quiz |
| 11 (13 May) | | Recurrence relations | Quiz |
| 12 (20 May) | | Generating functions | Assignment 2, Quiz |

| Week | Module | Topic | Assessment due |
|------|--------|-------|----------------|
| 13 (27 May) | | Revision, catchup | Module Exam 3, Quiz |

The timing of the specific topics is indicative only and may need to be adjusted. Any such adjustment will be advertised via iLearn.

# Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

## Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

## Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing an

d maths support, academic skills development and wellbeing consultations.

# Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

## The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

# Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

# Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

# IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

# Changes from Previous Offering

There are no changes from the previous offering.

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Unit information based on version 2024.01R of the [Handbook](#)